SEQUENCE LISTING

<110> Fred Hutchinson Cancer Research Center
      Stoddard, Barry L.
      Pratt, Kathleen
      Fujikawa, Kazuo
      Davie, Earl W.

<120> CRYSTAL OF A TRUNCATED PROTEIN CONSTRUCT CONTAINING A
      COAGULATION FACTOR VIII C2 DOMAIN IN THE PRESENCE OR
      ABSENCE OF A BOUND LIGAND AND METHODS OF USE THEREOF

<130> 14538A-005310PC

<140>
<141>

<150> 60/148,907
<151> 1999-08-13

<160> 12

<170> PatentIn Ver. 2.1

<210> 1
<211> 2332
<212> PRT
<213> Homo sapiens

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Arg Val Pro Lys Ser Phe Pro Phe Asn Thr Ser Val Val Tyr Lys Lys
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Thr Leu Phe Val Glu Phe Thr Asp His Leu Phe Asn Ile Ala Lys Pro
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Arg Pro Pro Trp Met Gly Leu Leu Gly Pro Thr Ile Gln Ala Glu Val
65   70   75   80

Tyr Asp Thr Val Val Ile Thr Leu Lys Asn Met Ala Ser His Pro Val
                85   90   95

1

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Ser Leu His Ala Val Gly Val Ser Tyr Trp Lys Ala Ser Glu Gly Ala
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Glu Tyr Asp Asp Gln Thr Ser Gln Arg Glu Lys Glu Asp Asp Lys Val
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Phe Pro Gly Gly Ser His Thr Tyr Val Trp Gln Val Leu Lys Glu Asn
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Gly Pro Met Ala Ser Asp Pro Leu Cys Leu Thr Tyr Ser Tyr Leu Ser
145                 150             155             160

His Val Asp Leu Val Lys Asp Leu Asn Ser Gly Leu Ile Gly Ala Leu
                165             170             175

Leu Val Cys Arg Glu Gly Ser Leu Ala Lys Glu Lys Thr Gln Thr Leu
            180             185             190

His Lys Phe Ile Leu Leu Phe Ala Val Phe Asp Glu Gly Lys Ser Trp
            195             200             205

His Ser Glu Thr Lys Asn Ser Leu Met Gln Asp Arg Asp Ala Ala Ser
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Ala Arg Ala Trp Pro Lys Met His Thr Val Asn Gly Tyr Val Asn Arg
225             230             235             240

Ser Leu Pro Gly Leu Ile Gly Cys His Arg Lys Ser Val Tyr Trp His
            245             250             255

Val Ile Gly Met Gly Thr Thr Pro Glu Val His Ser Ile Phe Leu Glu
            260             265             270

Gly His Thr Phe Leu Val Arg Asn His Arg Gln Ala Ser Leu Glu Ile
            275             280             285

Ser Pro Ile Thr Phe Leu Thr Ala Gln Thr Leu Leu Met Asp Leu Gly
    290                 295             300

Gln Phe Leu Leu Phe Cys His Ile Ser Ser His Gln His Asp Gly Met
305                 310             315             320

Glu Ala Tyr Val Lys Val Asp Ser Cys Pro Glu Glu Pro Gln Leu Arg
            325             330             335

Met Lys Asn Asn Glu Glu Ala Glu Asp Tyr Asp Asp Asp Leu Thr Asp
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2

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Ser Glu Met Asp Val Val Arg Phe Asp Asp Asp Asn Ser Pro Ser Phe
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Ile Gln Ile Arg Ser Val Ala Lys Lys His Pro Lys Thr Trp Val His
        370             375             380

Tyr Ile Ala Ala Glu Glu Glu Asp Trp Asp Tyr Ala Pro Leu Val Leu
385             390             395             400

Ala Pro Asp Asp Arg Ser Tyr Lys Ser Gln Tyr Leu Asn Asn Gly Pro
            405             410             415

Gln Arg Ile Gly Arg Lys Tyr Lys Lys Val Arg Phe Met Ala Tyr Thr
        420             425             430

Asp Glu Thr Phe Lys Thr Arg Glu Ala Ile Gln His Glu Ser Gly Ile
        435             440             445

Leu Gly Pro Leu Leu Tyr Gly Glu Val Gly Asp Thr Leu Leu Ile Ile
        450             455             460

Phe Lys Asn Gln Ala Ser Arg Pro Tyr Asn Ile Tyr Pro His Gly Ile
465             470             475             480

Thr Asp Val Arg Pro Leu Tyr Ser Arg Arg Leu Pro Lys Gly Val Lys
            485             490             495

His Leu Lys Asp Phe Pro Ile Leu Pro Gly Glu Ile Phe Lys Tyr Lys
            500             505             510

Trp Thr Val Thr Val Glu Asp Gly Pro Thr Lys Ser Asp Pro Arg Cys
        515             520             525

Leu Thr Arg Tyr Tyr Ser Ser Phe Val Asn Met Glu Arg Asp Leu Ala
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Ser Gly Leu Ile Gly Pro Leu Leu Ile Cys Tyr Lys Glu Ser Val Asp
545             550             555             560

Gln Arg Gly Asn Gln Ile Met Ser Asp Lys Arg Asn Val Ile Leu Phe
            565             570             575

Ser Val Phe Asp Glu Asn Arg Ser Trp Tyr Leu Thr Glu Asn Ile Gln
            580             585             590

Arg Phe Leu Pro Asn Pro Ala Gly Val Gln Leu Glu Asp Pro Glu Phe
        595             600             605
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3

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Gln Ala Ser Asn Ile Met His Ser Ile Asn Gly Tyr Val Phe Asp Ser
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Leu Gln Leu Ser Val Cys Leu His Glu Val Ala Tyr Trp Tyr Ile Leu
625                 630                 635                     640

Ser Ile Gly Ala Gln Thr Asp Phe Leu Ser Val Phe Phe Ser Gly Tyr
                645                 650                 655

Thr Phe Lys His Lys Met Val Tyr Glu Asp Thr Leu Thr Leu Phe Pro
            660                 665                 670

Phe Ser Gly Glu Thr Val Phe Met Ser Met Glu Asn Pro Gly Leu Trp
            675                 680                 685

Ile Leu Gly Cys His Asn Ser Asp Phe Arg Asn Arg Gly Met Thr Ala
    690                 695                 700

Leu Leu Lys Val Ser Ser Cys Asp Lys Asn Thr Gly Asp Tyr Tyr Glu
705                 710                 715                     720

Asp Ser Tyr Glu Asp Ile Ser Ala Tyr Leu Leu Ser Lys Asn Asn Ala
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Ile Glu Pro Arg Ser Phe Ser Gln Asn Ser Arg His Pro Ser Thr Arg
            740                 745                 750

Gln Lys Gln Phe Asn Ala Thr Thr Ile Pro Glu Asn Asp Ile Glu Lys
            755                 760                 765

Thr Asp Pro Trp Phe Ala His Arg Thr Pro Met Pro Lys Ile Gln Asn
    770                 775                 780

Val Ser Ser Ser Asp Leu Leu Met Leu Leu Arg Gln Ser Pro Thr Pro
785                 790                 795                     800

His Gly Leu Ser Leu Ser Asp Leu Gln Glu Ala Lys Tyr Glu Thr Phe
                805                 810                 815

Ser Asp Asp Pro Ser Pro Gly Ala Ile Asp Ser Asn Asn Ser Leu Ser
            820                 825                 830

Glu Met Thr His Phe Arg Pro Gln Leu His His Ser Gly Asp Met Val
            835                 840                 845

Phe Thr Pro Glu Ser Gly Leu Gln Leu Arg Leu Asn Glu Lys Leu Gly
    850                 855                 860
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Thr Thr Ala Ala Thr Glu Leu Lys Lys Leu Asp Phe Lys Val Ser Ser
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Gly Thr Asp Asn Thr Ser Ser Leu Gly Pro Pro Ser Met Pro Val His
        900             905             910

Tyr Asp Ser Gln Leu Asp Thr Thr Leu Phe Gly Lys Lys Ser Ser Pro
    915             920             925

Leu Thr Glu Ser Gly Gly Pro Leu Ser Leu Ser Glu Glu Asn Asn Asp
    930             935             940

Ser Lys Leu Leu Glu Ser Gly Leu Met Asn Ser Gln Glu Ser Ser Trp
945             950             955             960

Gly Lys Asn Val Ser Ser Thr Glu Ser Gly Arg Leu Phe Lys Gly Lys
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Arg Ala His Gly Pro Ala Leu Leu Thr Lys Asp Asn Ala Leu Phe Lys
        980             985             990

Val Ser Ile Ser Leu Leu Lys Thr Asn Lys Thr Ser Asn Asn Ser Ala
    995             1000            1005

Thr Asn Arg Lys Thr His Ile Asp Gly Pro Ser Leu Leu Ile Glu Asn
    1010            1015            1020

Ser Pro Ser Val Trp Gln Asn Ile Leu Glu Ser Asp Thr Glu Phe Lys
1025            1030            1035            1040

Lys Val Thr Pro Leu Ile His Asp Arg Met Leu Met Asp Lys Asn Ala
            1045            1050            1055

Thr Ala Leu Arg Leu Asn His Met Ser Asn Lys Thr Thr Ser Ser Lys
        1060            1065            1070

Asn Met Glu Met Val Gln Gln Lys Lys Glu Gly Pro Ile Pro Pro Asp
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Ala Gln Asn Pro Asp Met Ser Phe Phe Lys Met Leu Phe Leu Pro Glu
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Ser Ala Arg Trp Ile Gln Arg Thr His Gly Lys Asn Ser Leu Asn Ser
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5

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Gly Gln Gly Pro Ser Pro Lys Gln Leu Val Ser Leu Gly Pro Glu Lys
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Gly Lys Gly Glu Phe Thr Lys Asp Val Gly Leu Lys Glu Met Val Phe
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Pro Ser Ser Arg Asn Leu Phe Leu Thr Asn Leu Asp Asn Leu His Glu
     1170                  1175                  1180

Asn Asn Thr His Asn Gln Glu Lys Lys Ile Gln Glu Glu Ile Glu Lys
     1185                  1190                  1195                  1200

Lys Glu Thr Leu Ile Gln Glu Asn Val Val Leu Pro Gln Ile His Thr
          1205                  1210                  1215

Val Thr Gly Thr Lys Asn Phe Met Lys Asn Leu Phe Leu Leu Ser Thr
          1220                  1225                  1230

Arg Gln Asn Val Glu Gly Ser Tyr Asp Gly Ala Tyr Ala Pro Val Leu
          1235                  1240                  1245

Gln Asp Phe Arg Ser Leu Asn Asp Ser Thr Asn Arg Thr Lys Lys His
     1250                  1255                  1260

Thr Ala His Phe Ser Lys Lys Gly Glu Glu Glu Asn Leu Glu Gly Leu
     1265                  1270                  1275                  1280

Gly Asn Gln Thr Lys Gln Ile Val Glu Lys Tyr Ala Cys Thr Thr Arg
          1285                  1290                  1295

Ile Ser Pro Asn Thr Ser Gln Gln Asn Phe Val Thr Gln Arg Ser Lys
          1300                  1305                  1310

Arg Ala Leu Lys Gln Phe Arg Leu Pro Leu Glu Glu Thr Glu Leu Glu
          1315                  1320                  1325

Lys Arg Ile Ile Val Asp Asp Thr Ser Thr Gln Trp Ser Lys Asn Met
     1330                  1335                  1340

Lys His Leu Thr Pro Ser Thr Leu Thr Gln Ile Asp Tyr Asn Glu Lys
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Glu Lys Gly Ala Ile Thr Gln Ser Pro Leu Ser Asp Cys Leu Thr Arg
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Ser His Ser Ile Pro Gln Ala Asn Arg Ser Pro Leu Pro Ile Ala Lys
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Val Ser Ser Phe Pro Ser Ile Arg Pro Ile Tyr Leu Thr Arg Val Leu
        1395                1400                1405

Phe Gln Asp Asn Ser Ser His Leu Pro Ala Ala Ser Tyr Arg Lys Lys
    1410                1415                1420

Asp Ser Gly Val Gln Glu Ser Ser His Phe Leu Gln Gly Ala Lys Lys
1425                1430                1435                1440

Asn Asn Leu Ser Leu Ala Ile Leu Thr Leu Glu Met Thr Gly Asp Gln
            1445                1450                1455

Arg Glu Val Gly Ser Leu Gly Thr Ser Ala Thr Asn Ser Val Thr Tyr
        1460                1465                1470

Lys Lys Val Glu Asn Thr Val Leu Pro Lys Pro Asp Leu Pro Lys Thr
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Ser Gly Lys Val Glu Leu Leu Pro Lys Val His Ile Tyr Gln Lys Asp
    1490                1495                1500

Leu Phe Pro Thr Glu Thr Ser Asn Gly Ser Pro Gly His Leu Asp Leu
1505                1510                1515                1520

Val Glu Gly Ser Leu Leu Gln Gly Thr Glu Gly Ala Ile Lys Trp Asn
            1525                1530                1535

Glu Ala Asn Arg Pro Gly Lys Val Pro Phe Leu Arg Val Ala Thr Glu
        1540                1545                1550

Ser Ser Ala Lys Thr Pro Ser Lys Leu Leu Asp Pro Leu Ala Trp Asp
        1555                1560                1565

Asn His Tyr Gly Thr Gln Ile Pro Lys Glu Glu Trp Lys Ser Gln Glu
    1570                1575                1580

Lys Ser Pro Glu Lys Thr Ala Phe Lys Lys Lys Asp Thr Ile Leu Ser
1585                1590                1595                1600

Leu Asn Ala Cys Glu Ser Asn His Ala Ile Ala Ala Ile Asn Glu Gly
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Gln Asn Lys Pro Glu Ile Glu Val Thr Trp Ala Lys Gln Gly Arg Thr
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Glu Arg Leu Cys Ser Gln Asn Pro Pro Val Leu Lys Arg His Gln Arg
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Glu Ile Thr Arg Thr Thr Leu Gln Ser Asp Gln Glu Glu Ile Asp Tyr
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Asp Asp Thr Ile Ser Val Glu Met Lys Lys Glu Asp Phe Asp Ile Tyr
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Asp Glu Asp Glu Asn Gln Ser Pro Arg Ser Phe Gln Lys Lys Thr Arg
               1685                1690                1695

His Tyr Phe Ile Ala Ala Val Glu Arg Leu Trp Asp Tyr Gly Met Ser
          1700                1705                1710

Ser Ser Pro His Val Leu Arg Asn Arg Ala Gln Ser Gly Ser Val Pro
     1715                1720                1725

Gln Phe Lys Lys Val Val Phe Gln Glu Phe Thr Asp Gly Ser Phe Thr
    1730                1735                1740

Gln Pro Leu Tyr Arg Gly Glu Leu Asn Glu His Leu Gly Leu Leu Gly
1745                1750                1755                1760

Pro Tyr Ile Arg Ala Glu Val Glu Asp Asn Ile Met Val Thr Phe Arg
               1765                1770                1775

Asn Gln Ala Ser Arg Pro Tyr Ser Phe Tyr Ser Ser Leu Ile Ser Tyr
               1780                1785                1790

Glu Glu Asp Gln Arg Gln Gly Ala Glu Pro Arg Lys Asn Phe Val Lys
          1795                1800                1805

Pro Asn Glu Thr Lys Thr Tyr Phe Trp Lys Val Gln His His Met Ala
     1810                1815                1820

Pro Thr Lys Asp Glu Phe Asp Cys Lys Ala Trp Ala Tyr Phe Ser Asp
1825                1830                1835                1840

Val Asp Leu Glu Lys Asp Val His Ser Gly Leu Ile Gly Pro Leu Leu
               1845                1850                1855

Val Cys His Thr Asn Thr Leu Asn Pro Ala His Gly Arg Gln Val Thr
          1860                1865                1870

Val Gln Glu Phe Ala Leu Phe Phe Thr Ile Phe Asp Glu Thr Lys Ser
     1875                1880                1885
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Trp Tyr Phe Thr Glu Asn Met Glu Arg Asn Cys Arg Ala Pro Cys Asn
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Ile Gln Met Glu Asp Pro Thr Phe Lys Glu Asn Tyr Arg Phe His Ala
1905                1910                1915                1920

Ile Asn Gly Tyr Ile Met Asp Thr Leu Pro Gly Leu Val Met Ala Gln
                1925                1930                1935

Asp Gln Arg Ile Arg Trp Tyr Leu Leu Ser Met Gly Ser Asn Glu Asn
            1940                1945                1950

Ile His Ser Ile His Phe Ser Gly His Val Phe Thr Val Arg Lys Lys
        1955                1960                1965

Glu Glu Tyr Lys Met Ala Leu Tyr Asn Leu Tyr Pro Gly Val Phe Glu
    1970                1975                1980

Thr Val Glu Met Leu Pro Ser Lys Ala Gly Ile Trp Arg Val Glu Cys
1985                1990                1995                2000

Leu Ile Gly Glu His Leu His Ala Gly Met Ser Thr Leu Phe Leu Val
            2005                2010                2015

Tyr Ser Asn Lys Cys Gln Thr Pro Leu Gly Met Ala Ser Gly His Ile
            2020                2025                2030

Arg Asp Phe Gln Ile Thr Ala Ser Gly Gln Tyr Gly Gln Trp Ala Pro
        2035                2040                2045

Lys Leu Ala Arg Leu His Tyr Ser Gly Ser Ile Asn Ala Trp Ser Thr
    2050                2055                2060

Lys Glu Pro Phe Ser Trp Ile Lys Val Asp Leu Leu Ala Pro Met Ile
2065                2070                2075                2080

Ile His Gly Ile Lys Thr Gln Gly Ala Arg Gln Lys Phe Ser Ser Leu
            2085                2090                2095

Tyr Ile Ser Gln Phe Ile Ile Met Tyr Ser Leu Asp Gly Lys Lys Trp
        2100                2105                2110

Gln Thr Tyr Arg Gly Asn Ser Thr Gly Thr Leu Met Val Phe Phe Gly
        2115                2120                2125

Asn Val Asp Ser Ser Gly Ile Lys His Asn Ile Phe Asn Pro Pro Ile
    2130                2135                2140
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Ile Ala Arg Tyr Ile Arg Leu His Pro Thr His Tyr Ser Ile Arg Ser
2145            2150            2155            2160

Thr Leu Arg Met Glu Leu Met Gly Cys Asp Leu Asn Ser Cys Ser Met
            2165            2170            2175

Pro Leu Gly Met Glu Ser Lys Ala Ile Ser Asp Ala Gln Ile Thr Ala
        2180            2185            2190

Ser Ser Tyr Phe Thr Asn Met Phe Ala Thr Trp Ser Pro Ser Lys Ala
        2195            2200            2205

Arg Leu His Leu Gln Gly Arg Ser Asn Ala Trp Arg Pro Gln Val Asn
    2210            2215            2220

Asn Pro Lys Glu Trp Leu Gln Val Asp Phe Gln Lys Thr Met Lys Val
2225            2230            2235            2240

Thr Gly Val Thr Thr Gln Gly Val Lys Ser Leu Leu Thr Ser Met Tyr
        2245            2250            2255

Val Lys Glu Phe Leu Ile Ser Ser Ser Gln Asp Gly His Gln Trp Thr
        2260            2265            2270

Leu Phe Phe Gln Asn Gly Lys Val Lys Val Phe Gln Gly Asn Gln Asp
        2275            2280            2285

Ser Phe Thr Pro Val Val Asn Ser Leu Asp Pro Pro Leu Leu Thr Arg
    2290            2295            2300

Tyr Leu Arg Ile His Pro Gln Ser Trp Val His Gln Ile Ala Leu Arg
2305            2310            2315            2320

Met Glu Val Leu Gly Cys Glu Ala Gln Asp Leu Tyr
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<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: PCR primer

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<223> Description of Artificial Sequence: PCR Primer

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<212> DNA
<213> Artificial Sequence

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Pro Ser Xaa Ala Arg Leu His Leu Gln Gly Arg Ser Asn Ala Trp Arg
          35                  40                  45

Pro Gln Val Asn Asn Xaa Lys Glu Trp Leu Gln Val Asp Phe Gln Lys
          50                  55                  60

Thr Xaa Lys Val Thr Gly Val Thr Xaa Xaa Gly Val Lys Ser Leu Leu
 65                  70                  75                  80

Thr Ser Met Tyr Val Lys Glu Phe Leu Xaa Ser Ser Ser Gln Asp Gly
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His Gln Trp Thr Leu Phe Phe Gln Asn Gly Lys Val Lys Val Xaa Gln
              100                 105                 110
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Gly Asn Gln Asp Ser Phe Thr Pro Val Val Asn Ser Leu Asp Pro Xaa
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Leu Leu Thr Xaa Tyr Leu Xaa Ile His Pro Gln Ser Trp Val His Gln
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Ile Ala Leu Xaa Met Glu Val Leu Xaa Cys Glu Ala Gln Asp Leu Tyr
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<213> Murine FVIII C2

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            20              25              30

Pro Ser Gln Ala Arg Leu His Leu Gln Gly Arg Thr Asn Ala Trp Arg
        35              40              45

Pro Gln Val Asn Asp Pro Lys Gln Trp Leu Gln Val Asp Leu Gln Lys
    50              55              60

Thr Met Lys Val Thr Gly Ile Ile Thr Gln Gly Val Lys Ser Leu Phe
 65              70              75              80

Thr Ser Met Phe Val Lys Glu Phe Leu Ile Ser Ser Ser Gln Asp Gly
            85              90              95

His His Trp Thr Gln Ile Leu Tyr Asn Gly Lys Val Lys Val Phe Gln
            100             105             110

Gly Asn Gln Asp Ser Ser Thr Pro Met Met Asn Ser Leu Asp Pro Pro
        115             120             125

Leu Leu Thr Arg Tyr Leu Arg Ile His Pro Gln Ile Trp Glu His Gln
    130             135             140

Ile Ala Leu Arg Leu Glu Ile Leu Gly Cys Glu Ala Gln Gln Gln Tyr
145             150             155             160
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17

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            20   25   30

Pro Ser Gln Ala Arg Leu His Leu Gln Gly Arg Thr Asn Ala Trp Arg
        35   40   45

Pro Gln Ala Asn Asn Pro Lys Glu Trp Leu Gln Val Asp Phe Arg Lys
    50   55   60

Thr Met Lys Val Thr Gly Ile Thr Thr Gln Gly Val Lys Ser Leu Leu
65   70   75   80

Ile Ser Met Tyr Val Lys Glu Phe Leu Ile Ser Ser Ser Gln Asp Gly
                85   90   95

His Asn Trp Thr Leu Phe Leu Gln Asn Gly Lys Val Lys Val Phe Gln
            100   105   110

Gly Asn Arg Asp Ser Ser Thr Pro Val Arg Asn Arg Leu Glu Pro Pro
        115   120   125

Leu Val Ala Arg Tyr Val Arg Leu His Pro Gln Ser Trp Ala His His
        130   135   140

Ile Ala Leu Arg Leu Glu Val Leu Gly Cys Asp Thr Gln Gln Pro Ala
145   150   155   160

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Gln Ile Thr Ala Ser Ser His Leu Ser Asn Ile Phe Ala Thr Trp Ser
            20                  25                  30

Pro Ser Gln Ala Arg Leu His Leu Gln Gly Arg Thr Asn Ala Trp Arg
            35                  40                  45

Pro Arg Val Ser Ser Ala Glu Glu Trp Leu Gln Val Asp Leu Gln Lys
        50                  55                  60

Thr Val Lys Val Thr Gly Ile Thr Thr Gln Gly Val Lys Ser Leu Leu
65                  70                  75                  80

Ser Ser Met Tyr Val Lys Glu Phe Leu Val Ser Ser Ser Gln Asp Gly
                85                  90                  95

Arg Arg Trp Thr Leu Phe Leu Gln Asp Gly His Thr Lys Val Phe Gln
            100                 105                 110

Gly Asn Gln Asp Ser Ser Thr Pro Val Val Asn Ala Leu Asp Pro Pro
            115                 120                 125

Leu Phe Thr Arg Tyr Leu Arg Ile His Pro Thr Ser Trp Ala Gln His
        130                 135                 140

Ile Ala Leu Arg Leu Glu Val Leu Gly Cys Glu Ala Gln Asp Leu Tyr
145                 150                 155                 160
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<400> 11

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1               5                   10                  15

Gln Ile Thr Ala Ser Ser Phe Lys Lys Ser Trp Trp Gly Asp Tyr Trp
            20                  25                  30
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Glu Pro Phe Arg Ala Arg Leu Asn Ala Gln Gly Arg Val Asn Ala Trp
         35                  40                  45

Gln Ala Lys Ala Asn Asn Asn Lys Gln Trp Leu Glu Ile Asp Leu Leu
    50                  55                  60

Lys Ile Lys Lys Ile Thr Ala Ile Ile Thr Gln Gly Cys Lys Ser Leu
65                  70                  75                      80

Ser Ser Glu Met Tyr Val Lys Ser Tyr Thr Ile His Tyr Ser Glu Gln
                85                  90                  95

Gly Val Glu Trp Lys Pro Tyr Arg Leu Lys Ser Ser Met Val Asp Lys
                100                 105                 110

Ile Phe Glu Gly Asn Thr Asn Thr Lys Gly His Val Lys Asn Phe Phe
        115                 120                 125

Asn Pro Pro Ile Ile Ser Arg Phe Ile Arg Val Ile Pro Lys Thr Trp
    130                 135                 140

Asn Gln Ser Ile Ala Leu Arg Leu Glu Leu Phe Gly Cys Asp Ile
145                 150                 155
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Gln Ile Thr Ala Ser Gly Gln Tyr Gly Gln Trp Ala Pro Lys Leu Ala
                20                  25                  30

Arg Leu His Tyr Ser Gly Ser Ile Asn Ala Trp Ser Thr Lys Glu Trp
         35                  40                  45

Ile Lys Val Asp Leu Leu Ala Pro Met Ile Ile His Gly Ile Lys Thr
    50                  55                  60

Gln Gly Ala Arg Gln Lys Phe Ser Ser Leu Tyr Ile Ser Gln Phe Ile
65                  70                  75                      80

Ile Met Tyr Ser Leu Asp Gly His His Trp Gln Thr Tyr Arg Gly Asn
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                    85                        90                        95

    Ser Thr Gly Thr Leu Met Val Phe Gln Gly Asn Val Asp Ser Ser Gly
                100                 105                 110

    Ile Lys His Asn Ile Phe Asn Pro Pro Ile Ile Ala Arg Tyr Ile Arg
            115                 120                 125

    Leu His Pro Thr His Tyr Ser Ile Arg Ser Thr Leu Arg Met Glu Leu
            130                 135                 140

    Met Gly Cys Asp Leu Asn
    145                 150
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